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DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
O. H. TITTMANN, SUPERINTENDENT

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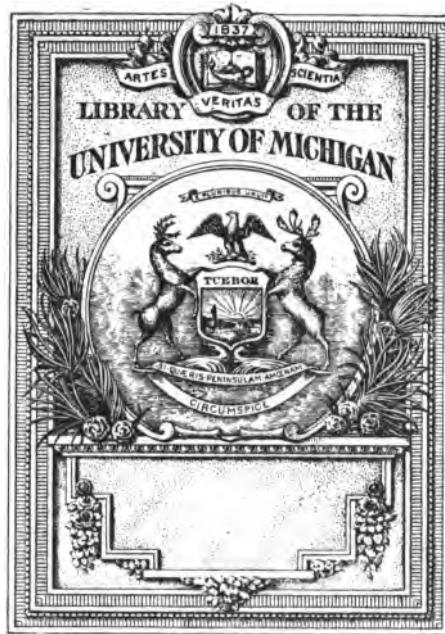
COAST PILOT NOTES

KUSKOKWIM BAY AND RIVER

MARCH 15, 1915



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DEPARTMENT OF COMMERCE,
UNITED STATES COAST AND GEODETIC SURVEY,
Washington, D. C., March 15, 1915.

This publication furnishes the available information relating to the navigation of Kuskokwim Bay and River from Cape Newenham northward, and is a part of a coast-pilot publication, now in preparation, which will cover the coast of Alaska westward and northward of Yakutat Bay.

It is based upon the surveys of the United States Coast and Geodetic Survey, including information furnished by the compiler, R. R. Lukens, who has served for three seasons on survey parties in this region.

This publication has been prepared under the direction of Herbert C. Graves, chief of the Coast Pilot Section, in the office of J. J. Gilbert, inspector of hydrography and topography.

Navigators are requested to notify the Superintendent of the United States Coast and Geodetic Survey of any errors or omissions they may find in this publication or of additional matter which they think should be inserted for the information of mariners.

O. H. TITTMANN,
Superintendent.

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southerly or easterly winds tide rips, dangerous for boats, occur in the channel. The spits at the entrance are of shingle and steep-to. Fresh water may be had from a small stream near Baluka Hill.

Shoals extend $2\frac{1}{2}$ miles off the entrance of Goodnews Bay. In 1914 the channel with best water led across the shoals from southward, and had two bars, with a least depth of about 10 feet, $2\frac{1}{2}$ and $3\frac{1}{2}$ miles southward of the entrance. The following directions led through the channel: Bring the inner shore of the north spit just open of the west shore of the south spit, and stand in on this range, course 17° true ($N \frac{1}{4} W$ mag.), until across the bars. Then follow the south spit at a distance of $\frac{1}{2}$ mile, and cross the entrance to a position 300 yards eastward of the north spit. A 56° true ($NE \frac{3}{4} N$ mag.) course with the south side of the north spit astern will then lead in the channel through the bay for a distance of over 1 mile.

Mumtrak is a small native village at the head of Goodnews Bay, and can be reached by small craft only, owing to the extensive mud flats. Two small creeks enter the bay, one on each side of the village. There is a Government school and a native trader at Mumtrak.

Baluka Hill is a prominent conical hill 886 feet high, with a steep, rocky face that rises abruptly from the north side of the bay. Although lower than the mountains behind it, Baluka Hill usually stands out prominently from all parts of Kuskokwim Bay.

Carter Spit is a low sand spit about $4\frac{1}{2}$ miles long and from 50 to 300 yards wide. It incloses Carter Bay which is a wide area of shoals and mud flats. Around the end of the sand spit there is a narrow channel scoured out, affording an anchorage for launches and small craft. There is no protection from northward. A small stream known as *Indian Creek* flows into the east side of Carter Bay near two abandoned cabins, formerly called *Carter*. Fresh water can be obtained by boats from Indian Creek at high water.

Explorer Mountain is the highest peak northward of Goodnews Bay. From southward it appears as a long ridge and is recognized by three deep gulleys on its side. From westward it appears as a pyramid peak, the highest of the group.

Tooth Mountain is a flat topped mountain in the front range, and has a sharp, rocky pinnacle on the northern edge of its summit. It is easily recognized from the vicinity of Carter Spit.

Figure IV Mountain is a sharp peak in the front range eastward of Jacksmith Bay. The deep ravines on the side of this mountain form a perfect IV which is conspicuous from westward when the ravines are filled with snow. In the latter part of the summer the snow disappears from the ravines.

Cone Mountain is a large conical mountain in the first range.

Yukon Hill is low, but is the north end of the front range paralleling the coast, and is visible from the entrance of Eek Channel.

From westward it is not distinguishable, as it has the receding range as a background.

Thumb Mountain is a fairly sharp summit in the range which recedes from Jacksmith Bay. From off Quinhagak it resembles a huge thumb placed on a high flat mountain plateau. As Eek Island is approached the mountain appears as a ridge and is not so distinctive.

Jacksmith Bay is the large indentation 14 miles northward of Carter. It is entirely bare at low tide.

Quinhagak P. O. is almost inaccessible by water because of the great mud flats bordering its shores. Launches can enter the creek here only at the highest tides, and even small craft can hardly get within sight of the village and remain afloat at low water. Supplies are landed with great difficulty, owing to the extensive flats and their exposure. There is a Moravian mission, store, and Government school, and a limited amount of supplies may be procured. The church steeple is sometimes visible from Eek Channel.

Warehouse Bluff is a long dark-colored bluff about 12 miles northwestward of Quinhagak. This is an important landmark as it is the first land on the east bank to be sighted when ascending Eek Channel. No objects on the west shore are visible until approaching the head of Eek Channel.

Warehouse Creek is a deep creek about 2 miles above Warehouse Bluff. It is approached through a long tortuous channel through the mud flats that can be followed by small craft when the flats are bare. Small craft may find shelter here. The greatest range of tide in the bay occurs in the vicinity of Warehouse Creek.

Kuskokwak Creek flows into the east side of the river about 4 miles southward of Beacon Point. It is approached through a short channel across the flats and affords a good shelter for launches and other small craft. There is a depth of 4 fathoms just inside the mouth of this creek.

Beacon Point is generally considered the mouth of the river. Two range beacons are built on this point. The rear one is a 30-foot square tower and the front one is a low tripod. They mark the cross-over from Eek Channel.

Popokamute is a large native summer village on the west bank at the mouth of the river just across from Beacon Point.

Eek Island is a grass-covered mud flat cut up by deep sloughs, and is covered by the higher tides. Eek Island affords a feeding ground for many thousands of ducks and geese.

West Point is the local name given the fishing camp on the west bank of the river just above Eek Island. The native pilot "Capt. John," lives near here, and "Moses" is often found at the fishing camp.

There are a number of small native villages on the river between West Point and Bethel.

Bethel is considered the head of ocean navigation. There are a Moravian mission, sawmill, and two or three stores located here. A river steamer is operated from Bethel to the headwaters of the river. At Bethel the Kuskokwim Commercial Co. has a large warehouse with rock-filled cribs to which large vessels can moor and discharge. The range of tide here is only about 3 feet, but the stage of the river has considerable influence on depths.

Bethel is the supply point for the lower Kuskokwim Valley. About 13 feet is the deepest draft that should attempt to reach Bethel, although a vessel drawing 14 feet has ascended the river to that point.

Mail facilities.—The mail for the lower Kuskokwim comes monthly by the way of the Yukon and Holy Cross Mission. It is transported over the portage to the Kuskokwim and carried down that river in small boats as far as Quinhagak. Power schooners from Seattle also carry mail when practicable.

Pilots.—There are two native pilots who know the river above Eek Island. They are known locally as "Moses" and "Capt. John." "Capt. John" lives on the west side of the river just above Eek Island, and "Moses" is usually found at his house on the east bank near the wrecked schooner *Volante*, abreast the upper end of Eek Island. On the appearance of a vessel, one of these natives usually puts off to engage himself as pilot. There is no established fee.

Currents.—The currents of Kuskokwim Bay and River are strong. A strong tidal current sweeps past Cape Newenham, setting approximately north and south true, and another follows the shore along the north side of the cape. In general the currents set in directions parallel to the axis of the channels between the shoals. In the deep channels off Jacksmith Bay the flood current has a velocity usually of about 2 to 2½ knots at strength, and the ebb from 2½ to 3 knots. In the vicinity of Eek Island, the strongest ebb current observed was 3½ knots. Here the current turns from one to one and one-half hours after high and low waters. The flood current is felt only about as far as Bethel.

Ice.—The river is usually open for navigation about June 1, although ice conditions are uncertain and vary much from year to year. In the fall ice makes on the upper river in October, and heavy ice forms off Goodnews Bay in November. Goodnews Bay freezes over entirely in the winter.

Weather.—All reports agree that the best weather usually occurs in March and April of the early spring. During the summer southeast to southwest gales are frequent, lasting from two to five days. These storms gradually blow themselves out, and are generally followed by a few days of good weather. In the early fall northerly

winds are frequent, and are usually accompanied by a clear sky. After the middle of September strong gales become frequent and prolonged.

Fresh water can be obtained from small streams in Security Cove, in Goodnews Bay near Baluka Hill, and from Indian Creek in Carter Bay.

Tides.—In Kuskokwim Bay and River there are usually two unequal high waters and, to a much less extent, two unequal low waters during the lunar day, the inequality varying principally with the declination of the moon. About two days after the moon is on the equator the tides are generally nearly equal and have the least diurnal range. About two days after the moon reaches its greatest declination (farthest N. or S.) the tides are very unequal, and usually have the greatest range of the month; these are called "great tropic tides."

On account of the difficulty of determining accurately the tidal elements in this region, a special table of predicted times and heights of high and low waters for 1915 at Apokak is in preparation, and will be available for issue prior to April 15, 1915. The following table is intended for use with that table. The time of high and low water for any day will be found by subtracting the time difference given in the following table from the predicted times for that day at Apokak. The best determination of the height of high and low water will be found by multiplying the height of the particular tide for that day at Apokak by the ratio of ranges from the following table:

Station.	Range of tide.		Tidal differences and ratios referred to Apokak.			
	Mean.	Great tropic.	Time of—		Ratio of ranges.	
			H. W.	L. W.		
Goodnews Bay (South spit)...	Feet.	Feet.	H. m.	H. m.	Feet.	
Carter.....	6.2	9.8	-3 30	-4 35	0.66	
Quinhagak.....	8.0	11.6	-2 40	-3 40	0.85	
Warehouse Creek.....	1 9.7	1 13.2	-1 35	(¹) 05	1 1.03	
Apokak.....	10.0	13.5	-0 55	-1 05	1.06	
	9.4	12.9	0 00	0 00	1.00	

¹ At Quinhagak, the water never fell to the true datum of lower low, as there is apparently some obstruction between the position of the tide staff and the channel in the river. Theoretical ranges for this station are given.

DIRECTIONS, KUSKOKWIM BAY AND RIVER.

About 13 feet is the deepest draft that should attempt to reach Bethel, although a vessel drawing 14 feet has ascended the river to that point.

The navigation of Kuskokwim River and its approaches is difficult. In the bay the shoals are generally hard and steep to. In a southerly storm a heavy sea makes up the bay nearly to Eek Island, and vessels caught on a shoal are in danger of being pounded to pieces.

The lead is the navigator's best aid, and it should be kept going constantly on both sides of the vessel. No definite rules can be given for following the channels by the surface indications of the water. At certain times the channels will be smooth with rips on the shoals; but again for no apparent reason the indications may be reversed, with rips in the channel and a slick on the shoals. The edge of a channel is often marked by a long line of foam, although cases have been known where the line of foam extended across the channel. It is always well to approach such a line with caution.

Mariners are strongly cautioned against attempting to follow the channels in the bay at high water. Owing to the inequality of the tides, a vessel grounding at high water may not float again for several days. By waiting for low water the mud flats become natural aids instead of dangers.

Passing about 2 miles westward of Cape Newenham make good a 28° true ($N \frac{1}{4} E$ mag.) course for about 6 miles until the cape bears 190° true ($S \frac{1}{4} E$ mag.). Then make good a 10° true ($N \frac{1}{4} W$ mag.) course with Cape Newenham directly astern for about 18 miles until Baluka Hill bears 65° true (NE mag.) and Red Mountain 121° true (E by S mag.). From this position make good a 341° true ($NW \frac{1}{4} N$ mag.) course for about 13 miles to a position 4 miles 256° true (SW by W mag.) of the elbow of Carter Spit. About June 15, 1915, a beacon for survey purposes will be erected on the elbow of Carter Spit.

In thick or hazy weather a route nearer the coast may be taken as follows: Pass $\frac{1}{2}$ mile off Cape Newenham and Seal Rock, and then make good a 70° true ($NE \frac{1}{4} E$ mag.) course for about $6\frac{1}{2}$ miles until Castle Rock, the southwest headland of Security Cove, bears 177° true (SSE mag.). Strong tidal currents occur along the north shore of Cape Newenham. From this position make good a 357° true (NNW mag.) course with Castle Rock astern for 14 miles until the summit of Red Mountain is abeam. Then make good a 341° true ($NW \frac{1}{4} N$ mag.) course for $19\frac{1}{2}$ miles to a position 4 miles 256° true (SW by W mag.) of the elbow of Carter Spit.

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